

Docket No. F-8634

Ser. No. 10/574,041

REMARKS

Claims 1-19 and 22-25 remain pending in this application. Claims 20-21 are previously canceled. Claims 1, 3, 13, and 14 are withdrawn. Claims 2, 4-12, and 15-19 and 22-25 are rejected. No new claim is added. Claims 25 are amended.

Applicants respectfully request reconsideration of the pending claims in light of the following remarks. Applicants respectfully submit that the application is in condition for allowance.

Subject Matter of the Claimed Invention

The subject matter of the claimed inventions is directed to a heat exchanger having first and second meandering pipe sections. The first meandering pipe section occurs in a first plane having two orthogonal axes (e.g., x-axis; y-axis). The second meandering pipe section occurs in a second plane parallel to the first plane. Each of the first and second meandering pipe sections includes straight pipe sections which extend along the first orthogonal axis (e.g., x-axis). A connecting pipe section (also referred to as a connection pipe) connects the first and second meandering pipe sections. Of particular significance is that the connecting pipe section shape is one in which the pipe bends outward while also twisting about its circumference. Such shape can be seen from the embodiments shown in Figures 22 and 25. Note that the connecting pipe section does not just bend perpendicular

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to the meandering pipe section (i.e., in a z-axis direction) (as in the embodiments shown in Figures 1-4), while remaining at the same y-axis coordinate (with slight changes along the x-axis to smoothen the curvature) - as per the Figures 1-4 embodiment. Instead the connecting pipe section changes along both the z-axis and y-axis (with slight changes along x-axis to smoothen the curvature) - as per the Figures 22 and 25 embodiment. Thus, the connecting pipe section changes shape in three orthogonal directions along its length.

Section 103 Rejections and the Cited Art

Independent claims 2 and 25 are rejected under 35 USC §103(a) as being unpatentable over Marukasa Shigeo (JP 2001 199697). Independent claims 2 and 25 also are rejected under 35 USC §103(a) as being unpatentable over Tokyo Radiator Manufacturing (JP 63-190777) in view of Charlton (U.S. Patent No. 2,851,082). The Examiner combines the primary references with additional references to also reject the dependent claims.

The Examiner acknowledges that the Tokyo Radiator Manufacturing reference does not disclose a connection pipe section extending outwardly and twisted to connect two meandering pipe sections. The Examiner indicates that both the Marukasa reference and the Charlton reference disclose such a connection pipe. It is respectfully submitted that both references merely teach a connection pipe that

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is curved outward. Neither reference discloses that a connection pipe also may be twisted about its circumference. It is respectfully submitted that none of the cited art discloses a connection pipe that extends so as to change shape about three axes - outwardly to change along one coordinate axis (and along a second coordinate axis to smoothen the curvature) and twisting so as to change along yet another coordinate axis.

In the Examiner's response to Applicants' arguments, the Examiner treats the 'twisting' limitation as being related to the method of forming the heat exchanger. It is respectfully submitted, however, that such limitation is directed to the shape of the connection pipe (claim 2) and connecting pipe section (claim 25) indicating how the shape changes along the length of the connecting pipe section - as described above. Accordingly, the limitation is to be given patentable weight as to the shape of the connecting pipe section / connection pipe.

The Claims Distinguished

Claim 2 distinguishes over the cited art based at least upon the following claim limitations:

- wherein the meandering pipe main body is so constructed that **the connection pipe between the one and the other meandering sections at one of the straight pipe section sides is curved outwardly while**

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- the connection pipe is twisted in the circumferential direction with regard to the axis directions of the straight pipe sections to narrow the distance between the one and the other meandering sections, and wherein the straight pipe sections of the one and the other meandering sections are arranged in parallel to each other;
- wherein said one meandering pipe section occurs in a first plane having first and second orthogonal axes, said other meandering pipe section occurs in a second plane parallel to the first plane, the straight pipe sections extend in a direction parallel to said first orthogonal axis, and the connecting pipe section has a shape which changes along at least a portion of its length relative to said first orthogonal axis, said second orthogonal axis and a third axis orthogonal to said first and second orthogonal axes.

It is respectfully submitted that the cited art does not disclose a connection pipe that is curved outwardly and twisted in the circumferential direction along its length with regard to the axis directions of the straight pipe sections. Further, it is respectfully submitted that the cited art does not disclose a connecting pipe section that changes shape along three orthogonal axes. In particular, the cited art shows only a change relative to one axis that is distinct from an axis direction of a straight pipe section.

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Claims 4-12, and 15-24 ultimately depend from claim 2 and distinguish over the cited art based at least upon the same reasons as given for claim 2.

Claim 25 distinguishes over the cited art based at least upon the following claim limitations:

- wherein the connecting pipe section curves outwardly and twists circumferentially along its length from the first meandering section to the second meandering section.
- wherein the connecting pipe section curves outwardly and twists circumferentially along its length from the first meandering section to the second meandering section, the connecting pipe section having a shape which changes along at least a portion of its length relative to said first orthogonal axis, said second orthogonal axis, and a third axis orthogonal to said first and second orthogonal axis.

It is respectfully submitted that the cited art does not disclose a connecting pipe section shaped to both curve outwardly and twist circumferentially along its length. Further, it is respectfully submitted that the cited art does not disclose a connecting pipe section that changes shape along three orthogonal axes. In particular, the cited art shows only a change relative to one axis that is distinct from an axis direction of a straight pipe section.

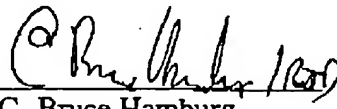
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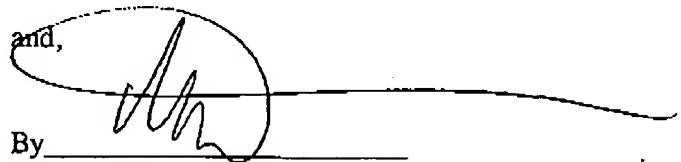
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Claims 5-11, 15-19, and 22-23 also ultimately depend from claim 25 and distinguish over the cited art based at least upon the same reasons as given for claim 25.

In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited.

Respectfully submitted,
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